between the first and second dorsal segments deeply constricted, that between the second and third moderately constricted.

South Island, Coronado Islands, Aug. 21, three males (*T. and W. Ckll.*). I at first supposed that this was the male of *H. grinnelli*, but the thorax and wings are so different that it seems necessary to regard it as a distinct species.

Halictus nevadensis Crawford.

One female taken; a little larger than the mainland form, which is apparently the commonest small green *Halictus* of Southern California. I took the species at the Scripps Institute, La Jolla, and at Orange.

NOCTUID NOTES FROM WESTERN CANADA, WITH DESCRIPTION OF TWO NEW SPECIES AND A VARIETY.

BY F. H. WOLLEY DOD, MIDNAPORE, ALTA.

Cucullia omissa, sp. nov.

Closely allied to *asteroides* Guen. and *postera* Guen. It principally differs from *asteroides* in being darker through out, and having dark secondaries in both sexes. Even the darkest specimens of *asteroides* seem always to have a faint violaceous tinge to the grey of the thorax and primaries, which *omissa* always lacks. The discoidal spots are even less distinct than in *asteroides*. In all *asteroides* which I have examined the secondaries are clean pearly white in the basal half or two-thirds, with a very irregular and narrow dusky outer border in the male, and a broader and darker one in the female. In all my *omissa* the secondaries are fuscous throughout, though palest basally. As is the case in *postera*, or at least in the prairie form of that species, the secondaries are practically alike in both sexes.

In a few of the darkest specimens there is a small discal spot on the secondaries beneath. Some specimens come very near the prairie form of *postera* in colour, but the new species is less maculate and streaky than that, and the discoidal spots are much less distinct, being in fact almost obliterated by the rusty red shade overlaying the cell and areas immediately beyond it. The longitudinal streak at the anal angle, the preceding crescent and cloud,

are exactly as in *postera* and *asteroides*. A dark brown streak bordering the full length of the inner margin exists in all *omissa* under examination, and is usually more obvious than in *asteroides*, much more so than in *postera*, from which it is often altogether absent. Size of *asteroides*.

Described from 13 ♂♂ and 8 ♀♀. Localities: 5 ♂♂, 2 ♀♀, Head of Pine Creek, near Calgary; May 18th (one), June 25th to August 13th, collected by the author; one pair, Windermere, B. C., July 12th, 1907 (the author); 1 ♀, Nelson, B. C. (H. Cane); 1 ♂, 3 ♀♀, Aweme, Man., June 6-14, 1910 (Criddle); 6 ♂♂, Cartwright, Man. (Heath collection); 1 ♀, Hymers, Ont., July 11th, 1912 (H. Dawson); and 1 ♀, Breezy Point, N.H., July 2-9, 1912 (L. W. Swett).

Types — ♂ in the author's collection, ♀ in that of Dr Wm. Barnes. Both Calgary specimens. My notes tell me that there is a specimen of this species in the British Museum from Denver, Colo., as well as typical *asteroides* from the same locality. I also have a Denver *asteroides* in my own collection.

Omissa is the No. 359 of my Alberta list, originally entered as *postera* on Smith's authority, and is the *postera* of the Kootenai and B. C. lists (Can. Ent., XXXVII, 227, June, 1905, and XLV, 94, April, 1913). The Manitoba specimens, some of which I am making co-types, are the darkest of the lot both in primaries and secondaries, and compared with Calgary, B C., and Ontario specimens, have less of the rusty red through and beyond the cell, and contrast more strongly with *asteroides*. In fact, though I choose the actual types from Calgary, it was a study of Manitoba material which finally decided me that the form was distinct. I found a short series of both *omissa* and *asteroides* in the Heath collection, and Mr. Wallis kindly loaned them to me for study. They were all on short pins, and it is reasonable to suppose that they were collected at Cartwright, especially as both have been taken at Treesbank, about fifty miles distant.

Mr. Tams has prepared two mounts of male genitalia of *omissa*, from Calgary and Aweme, and we have compared them with two of *asteroides* from Chicago and Cartwright, and one of British *asteris*, which agrees closely with Pierce's figure and description. The two *omissa* differ from the two *asteroides* in one

detail, and in that detail the deviation in the former is distinctly in the direction of *asteris*, which it resembles very closely in these organs. In *asteris*, as Mr. Pierce expresses it, "the clavus is produced to a small irregular knob, spinose." In *omissa* there is a distinct rounded spinose prominence on the clavus, though it is not similarly produced to a knob. In both my *omissa* mounts this prominence occupies the same relative position on the clavus as it does in Pierce's figure, and the clavus is much the same shape. But in my mount of *asteris* the clavus is shortened off abruptly immediately above the knob. In neither of the mounts of *asteroides* is there anything more than the faintest indication of this prominence. *Asteris* possesses two cornuti on the vesica, whereas *omissa* and *asteroides* possess only one. Superficially, also, the new species resembles *asteris* in colour and arrangement of shades more closely than does *asteroides*.

Copablepharon viridisparsa, sp. nov.

Head, thorax and primaries almost white with a very pale tinge of greenish ochreous, most pronounced in the female. The primaries have a slight irroration of grey scales, most numerous in the male, giving them a slightly sordid appearance. The male has a transverse posterior row of minute black points on the veins, very faintly indicated. Secondaries dull white in the male, with slight fuscous shadings and a fuscous central cloud; in the female a little darker and more shaded, though the central cloud is not as dark as in the male. Abdomen of the general ground colour of the secondaries in both specimens. Beneath dull white, with a dark fuscous cloud on the upper portion of the primaries from the base to the end of the cell, and extending between veins 2 and 5 nearly to the outer margin. This cloud is darkest in the male. Expanse of both specimens 45 mm.

Described from a single pair. The male from Lethbridge, Alta,. July 20th, 1915, at light, by Mr. E. H. Strickland, and loaned to the author by him, and the female taken at Calgary town lights by Mr. T. N. Willing on August 7th, 1902. The ♂ type will be placed in the collection of the Dominion Entomological Department at Ottawa, and the ♀ type is in the author's collection Both are in fine condition, though the male lacks one antenna.

NOCTUID MOTHS FROM WESTERN CANADA.

The species is the No. 385 of my Alberta List, originally recorded as *absidum*, on the authority of Dr. Fletcher. Another specimen shown me was taken at the same time and place as the female type, and is probably in the collection of the University of Saskatchewan at Humboldt, Sask. I have also seen a female specimen taken in Calgary on August 1st, 1907, by Mr. C. G. Garrett. I am under the impression that the species has been taken by Mr Baird at High River, where *grandis* also occasionally occurs. *Grandis* has also been taken at Lethbridge.

The male antennæ are minutely serrate-fasciculate as in *grandis*. The fore tibiæ in both specimens have two claws, one on each side of the extremity, the inner one the stronger. Nearly all my *grandis* appear to have three claws, or at any rate a claw and a very strong spine on the inner side, and a weaker claw on the outer. My only specimen of *alba* unfortunately lacks fore tibiæ. Sir George Hampson does not mention any species of the genus as possessing claws, merely stating "tibiæ strongly spined." The character may perhaps be somewhat variable, and at any rate the limit between claws and strong spines is not easily defined. The new species appears to come between *grandis* and *alba*. The former is lemon yellow with pure white secondaries, the latter pure white. My notes taken on other collections indicate that neither species is always immaculate, and though the female of *viridisparsa* has stood for many years in my collection as probably new, I have thought it best to await a better knowledge of it and other species of the genus. The receipt of the fine male from Mr. Strickland decides me that it is time the form was recognized by description. Should it ultimately prove to connect with either *grandis* or *alba*, which I think improbable, the name will still hold for it as a variety.

Euxoa thanatologia Dyar. (*Porosagrotis thanatologia* Dyar, Proc. U. S. Nat. Mus., XXVII, 833, 1904). Var. *boretha* Smith, (Journ. N. Y. Ent. Soc., XVI, 86, 1908). Var. *sordida* Smith, (Id. p. 86, seq.). All three described exclusively from specimens collected at Kaslo by Mr. Cockle.

Type form *thanatologia* Dyar. Described from a single female without abdomen. Condensed, the description reads: "Head, collar and thorax uniformly dark mouse grey . . . .

Forewings light grey basally and terminally (subterminally evidently meant, W. D.), "the whole median space blackish discolorous . . . . A black basal dash . . . . Lines not strongly defined . . . . Orbicular circular, dusky filled, reniform pale and narrowly black-ringed . . . . claviform black outlined, dark filled. Subterminal line pale . . . . with black dashes preceding it, especially at interspaces 2-4 and 5-7 . . . Terminal space blackish like the median space." I examined the type in February, 1910, and though I was unable to match it very exactly, it very strongly suggested an intermediate form between some very pale grey, and some very dark uniform brown specimens which I had taken at Calgary. Intermediate forms between these extremes have since been bred. The condition had suggested itself to me when I saw a figure of Dyar's type in the British Museum in the previous year, and seemed quite obvious when I subsequently saw a lot of material kindly loaned me by Mr. Cockle, including another figure of the type.

Var. *boretha* Smith. Described as a species (Condensed description): "Dull smoky brown. Collar inferiorly pale; . . . the pale portion limited above by a transverse black line. Costal region more or less contrastingly paler, tending to yellowish, spots discoloured, yellowish. Cell black filled . . . A black mark below median vein in basal space. Subterminal line of the ground colour, marked by the darker colour of the terminal space . . . preceded by a series of sagittate black marks in the interspaces. Orbicular tending to ovate, yellowish, contrasting. Reniform incompletely black margined, yellow, with smoky central line." Described from 3 ♂♂ and a ♀. Smith adds that the species appears to be allied to *terrealis*. This is explained by the fact that he had on several occasions named Calgary specimens of it "*terrealis*" for me, under which name a form of it appears in the earlier portion of my Alberta List. *Terrealis* is known to me only by the type, a ♂ from New Mexico in the Brooklyn Museum (Neumœgen collection). This has ciliate antennæ, and is referable to the *Rhizagrotis* (*Rhiacia* Hbn.) section of *Euxoa*. A figure of it is pretty well reproduced by Hampson. It is probably allied to *flavicollis* Sm., and I do not associate it with the species now under discussion, nor did I recognize it in Smith's collection. He also

suggests a resemblance to *perexcellens*, though admitting a marked difference in antennæ. The association has occasionally been made by others, with certain forms of it, but seems to me rather far-fetched.

My own notes on Smith's types say that the ♂ is "almost like some *ochrogaster*," and that the ♀, which I was able to match pretty closely, is much greyer, a fact mentioned by Smith. A few weeks later I compared my same specimen with type *thanatologia*, and more than suspected their identity. This has since been confirmed by examination of additional material, including a co-type of *boretha*, in Mr. Cockle's collection.

Var. *sordida* Smith. Also described as a species, picked out of the same lot sent him by Cockle. An extract of the description is: "Dull sordid brown, more or less shaded with black and smoky Collar concolorous, with a black median line. . . . A diffuse black streak through basal space. Cell darker or even blackish, but not solid black filled. Subterminal line marked by a slight darkening of terminal space, and by a preceding series of black interspaceal marks. Claviform narrow, pointed. Orbicular small, round or ovate, ringed with yellowish. Reniform large, edged with black; with an inner ring of yellow scales, and the centre more or less yellowish and discoloured." Described from 1 ♂ and 5 ♀♀. He adds that the maculation is like that of some of the species of the *ochrogaster* series. With this remark I entirely agree. He states further: "It differs from *boretha* in the flattened appearance, and in the concolorous orbicular, costa and collar. It varies in the amount of overlay in the median space, one example being almost purplish black." The flattened appearance is characteristic of the female, which sex predominated amongst his specimens called *sordida*. A comparison of the types with *boretha* certainly showed some contrast in the discoidal spots, but I do not think I should ever have ventured a separation upon these characters in anything allied to an Euxoa. My notes say of types: "The male is near some forms of *agrestis*." I matched the ♀ type prettly closely with a Calgary ♂, which up to that time I had held as a unique, though since then I have been able to find links connecting it with the rest of my material. Mr. Cockle has

helped me liberally in this, and lent me, along with other specimens, his *sordida* ♀ co-type.

There remains yet another well-marked form of *thanatologia*, not included in any of the above descriptions, which I now describe as follows:

Var perfida, var. nov. Head, collar, thorax and primaries even dull mahogany brown. A paler shade appears at the base below the median vein, sometimes pale sienna brown, sometimes greyish ochreous. This is usually very faint, diffuse, sometimes extending to the inner margin and sometimes taking the form of an ill-defined basal streak, extending to the outer extremity of the claviform. In some specimens the cross lines are barely indicated, and are rarely very distinct. The defining geminate portions may be just perceptibly darker than the ground, but they may be traceable only by the slightly paler filling of ochreous or sienna brown. Basal half line outwardly crenate in the interspaces. T. a. line almost upright, outwardly crenate in the interspaces. T. p. line with the outer portion obsolete, inwardly crenate in the interspaces, evenly outcurved over the cell, direct from veins 3 or 2 to inner margin. S. t. line indicated by a slightly paler shade, of the same colour as the filling of the other lines and the basal shading. The veins are sometimes just perceptibly darker, and there are sometimes faintly pale intervenular streaks preceding and of the same shade as the subterminal line. Claviform faintly indicated by ochreous scales. Orbicular absolutely concolorous, round or oblique, very narrowly ringed with pale ochreous grey, incomplete superiorly. Reniform moderate, pale ochreous, incompletely paler ringed, with an irregular filling of the ground colour, which is very slightly darker inferiorly. A very fine terminal darker line occasionally present, as is also a slightly paler line at the base of the fringes, which are the least shade paler than the ground colour. Secondaries not differing at all from other named forms of the species, dull fuscous, or faintly ochreous, white, dark fuscous outwardly, fringes whitish.

The number of specimens now before me to which this description applies is ten, all females, and I have never yet seen a male approaching this form. Localities: —Alberta: Calgary (6, 1 bred);

Red Deer River, (1); High River Baird, (1). Manitoba: Minjota, Dennis, (1). B. C.: Kaslo, Cockle, (1).

Type—♀, High River, Alta., Mr. Thomas Baird. This is the darkest and most even of all the specimens, and very closely resembles Holland's plate XXIII, fig. 6, which is unquestionably this form, is probably a ♀, and may be of a Calgary specimen. I consider this the more probable, as I sent Dr. Holland a number of Calgary specimens for figuring in that work, including the present form under the name "*titubatis*" on the authority of Smith. It is the No. 224 of my Alberta List, under the name "*punctigera*," on Smith's later authority (Can. Ent., XXXVII, 54, Feb., 1905). The form has no dead black markings whatsoever, and the general colour is very even. There is no darker basal streak, no indication of darker filling either in the discoidal spots or cell, except occasionally the slight inferior darkening of the reniform, no black dashes preceding the subterminal line, and the terminal space is usually of exactly the same colour as the rest of the ground, or barely perceptibly darker. As a rule, the only real contrast is the reniform. The form is the one predominating at Calgary, very few years having passed when I have not taken at light or treacle at least a few specimens, and always females. Moreover, I have very rarely taken any other forms here, and great was my surprise when I finally traced their connection with some other forms by means of comparison of types, and breeding, and a study of Kaslo material. I have not infrequently received the form from Manitoba and Saskatchewan. It occurs also at Banff, and I am under the impression that I have seen it from Vancouver Island. A few specimens were included in the material referred to as "*punctigera*" in the Kootenai List, though the bulk of the specimens were *perfusca* Grt. (*cocklei* Sm.),* occasional forms of which are certainly not unlike it. One of my Calgary females of *perfida* was taken by me in 1894 in cop. with a small dark red male, unfortunately rather worn, but practically indistinguishable from a small even red *ochrogaster*. For the next twenty years I never took a male at all like it which I did not feel tolerably safe in associating with *ochrogaster*, though I saw a few similar males from Saskatchewan and

*Can. Ent., XLIII, 339, Oct. 1911.

Manitoba, and have some from there now in my colledtion. The possibility of a mismate by the 1894 male still rendered the association doubtful, until Mr. Tams bred similar specimens from a dark female *sordida*, some of the results of which breeding are referred to in the explanation to Plate II, given below. Its likeness to a red *ochrogaster* is so exact, that, though it well deserves a varietal name, I dare not risk description except from specimens bred from a known parent, and I have not enough of such for distribution at present.

I may summarize by briefly designating the named variations of this species as follows:

E. thanatologia Dyar. Light grey, median and terminal space dark mahogany brown, contrasting. Black sagittate dashes preceding the subterminal line. Known in female sex only.

var. *boretha* Smith. Dull sienna brown, with pale collar and costa. Cell black filled, spots contrastingly pale. Sagittate s. t. dashes. As a very grey female was included under this description, the name should be considered as applying to the red-brown form only. Females of this form appear to be very rare.

var *sordida* Smith. Uniform dull red-brown or blackish-brown, more or less shaded with black or smoky. Cell darker or blackish. Sagittate s. t. dashes. This is a considerably darker form than *boretha*, and lacks the pale collar and costa. The great majority seen of this form have been females.

var. *perfida* Dod. Even dark mahogany brown with a very few pale ochreous or sienna brown lines and shadings. No black markings. Orbicular and reniform pale ringed, concolorous centrally, the reniform contrasting somewhat. Known to me in the female sex only.

As each of Smith's descriptions was drawn from a series of specimens, no two of which were alike, it seems best to fix the varietal names as nearly as possible fitting the actual types.

The expanse of the species varies from 34 mm. (a captured ♂) to 43 mm., the males as a rule being the smallest. I think this is the most variable Euxoa known to me on this continent, with the

doubtful exceptions of *auxiliars* and *tessellata*. Mr. Cockle has shown me a specimen rather strongly divergent from any I had previously seen, though in conjunction with the rest there are indications that it probably belongs here. It is the specimen referred to as *gagates* Grt. in the Kootenai List, and bore a label on Smith's authority "*balintis*." Though it certainly suggests a dull form of the latter, I think *thanatologia* the more probable. Though I have mentioned that certain variations bear more or less resemblance to several other species, and may possibly be confused with them, the general relationship is perhaps really closer to *ochrogaster* than to any other. The wing form is very similar. In fact, as already stated, I believe males are frequently inseparable superficially, though the larvæ are very different. The male antennæ in *ochrogaster* are usually a little more strongly serrate, but this difference is not reliable. The female abdomen of *thanatologia* is, however, more depressed and laterally cylindrical. *Punctigera* has several nearer allies, though so far as it is yet known, it is a dark brown little-marked form much after the manner of *perfida*, but is a broader winged species, has rougher scaling, and lacks the depressed abdomen in the female. It should be remarked, however, that this latter character varies somewhat in any species, according to the age at death, feeding, and degree of egg development in the individual. *Titubatis* Sm. (= *intrita* Morr.) is another species having a dull mahogany, poorly-marked form, extremely like *perfida* in colour, but it has shorter and more trigonate wings, differs in details of maculation, has more quadrate thorax with heavier vestiture, and very distinctly longer serrations to male antennæ. The confusion of occasional females is quite excusable.

Dr. Dyar refered his species to *Porosagrotis* on the strength of its possessing stout tibial claws. The character is a variable one throughout *Euxoa*, and is not a reliable guide. Smith stated that the form of the male genitalia was the only character which distinguished the genus. I admit not having so far examined them, but surely a genus based on genital structure is scarcely valid. The reference to *Chorizagrotis* was based on the flattened form of the abdomen, particularly in the female, and the narrow, elongate primaries. Sir George Hampson treats the genus as a section of

Euxoa, having male antennæ minutely serrate-fasciculate. In the present species they vary from almost simple fasciculate, to what he would call "moderately" serrate-fasciculate, variation being noticeable in specimens bred from the same female. The general rule for the ♂♂ is, however, minutely serrate-fasciculate as in *auxiliaris*.

Thanatologia flies from the latter end of June till about the middle of September. My earliest record is June 30th.

Explanation of Plates III and IV.

Plate III.

1—*Euxoa querula* Dod, ♂ co-type. Red River, near Gleichen.

2— " *querula*, ♀ type. Red Deer River, near Gleichen. (Can. Ent., XLVII, 36, No. 625, Feb., 1915.) Described under Rhizagrotis, which is treated by Hampson as a section of Euxoa with ciliate male antennæ.

3— " *lagena* Grt, ♂. Stockton, Utah.

4— " *lagena* Grt., ♀. Eureka, Utah.

5—*Cardepia mutata* Dod, ♂ type. Calgary. (Can. Ent., XLV, 29, No. 299, Feb. 1913.) Described under Mamestra, but referred by Hampson (in litt.) as a Cardepia, very near *nova* Smith. By structural characters this reference seems correct.

6—*Scotogramma trifolii* Rott., var. *albifusa* Walk. ♂, Montreal (Winn.) *Trifolii* is referred to *Scotogramma* by Hampson.

7—*Cucullia omissa* Dod, ♂ type. Calgary.

8— " *asteroides* Gn., ♀. Aweme, Man. In collection of N. Criddle.

9— " *postera* Gn., ♀. Calgary.

10— " *montanæ* Grt., ♂. Calgary.

11— " *indicata* Sm., ♂ type. Sheep Creek, near Calgary. I have referred this name to *obscurior* Smith, and both to *florea* Gn. The colour is blue grey, very near that of *intermedia*.

12— " *similaris* Grt., ♂. Didsbury, Alta.